PATENT ABSTRACTS OF JAPAN

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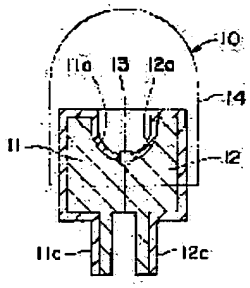
(54) SEMICONDUCTOR ELEMENT

(57)Abstract:
PURPOSE: To enable simple and sure assembly of a semiconductor chip and to prevent electrical connection to a base part of the semiconductor chip from being damaged during an operation process.
CONSTITUTION: The title semiconductor element 10 includes two base parts 11, 12 which can be electrically connected to an outside, a semiconductor chip 13 wherein one electrode part is electrically connected to one upper part of the base part and the other electrode part is electrically connected to the other upper part of the base part, and a lens part 14 which covers a semiconductor chip and an upper part of the base part to make it possible to electrically connect the two electrode parts to the base parts respectively by holding the semiconductor chip between the conductive parts 11c, 12c provided to an upper part of the two base parts.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to semiconductor devices, such as Light Emitting Diode containing semiconductor chips, such as a Light Emitting Diode chip laid to bases, such as a leadframe, and the upper part of this base, and the lens section fabricated by the resin mould so that the upper part of this semiconductor chip and this base might be covered.
[0002]
[Description of the Prior Art] Conventionally, such a semiconductor device (henceforth Light Emitting Diode), for example, light emitting diode, is constituted as shown in drawing 5 . That is, in drawing 5 , Light Emitting Diode1 consists of two leadframes 2 and 3 prolonged in parallel substantial up and down, a Light Emitting Diode chip 4 attached in upper-limit side 2a to which one leadframe 2 was expanded among these leadframes, and a lens 5 fabricated by the transparent resin mould so that this Light Emitting Diode chip 4 and the upper-limit field of leadframes 2 and 3 might be covered. In this case, while the above-mentioned Light Emitting Diode chip 4 is fixed to the pars basilaris ossis occipitalis of this concave partial 2b by electric conduction adhesion etc. and upper-limit side 2a of a leadframe 2 is electrically connected with this leadframe 2 by being formed as concave partial 2b like a paraboloid like illustration, wirebonding is carried out to the upper limit of the leadframe 3 of another side. When electric supply is performed for the Light Emitting Diode chip 4 through the lead section (not shown) of the lower part of two leadframes 2 and 3 by this, This Light Emitting Diode chip 4 emits light, and when it is reflected by this concave partial 2b and the light which carried out incidence to concave partial 2b among the light which carried out outgoing radiation from the Light Emitting Diode chip 4 at this time advances toward the upper part mostly, the luminous efficiency of the above Light Emitting Diode 1 is raised.
[0003]
[Problem(s) to be Solved by the Invention] However, in Light Emitting Diode1 constituted in this way, since it was necessary to connect by wirebonding to the leadframe 3 of another side while laying the Light Emitting Diode chip 4 in the upper limit of a leadframe 2 and fixing by die bonding, while assembly operation was troublesome, there was a problem that a bonding wire might be cut in a subsequent routing, or it might separate.
[0004] This invention aims at offering the semiconductor device which the electrical installation to the base of a semiconductor chip was made not to be spoiled in the routing while assembly of semiconductor chips, such as a Light Emitting Diode chip, is performed simply and certainly in view of the above point.
[0005]
[Means for Solving the Problem] Two bases where this invention may be electrically connected to the exterior since the above-mentioned purpose is attained, As opposed to one upper part of the above-mentioned base, the polar zone of another side receives [one polar zone] the upper part of another side of the above-mentioned base. In the semiconductor device containing the semiconductor chip connected electrically, respectively and the lens section fabricated by the resin mould so that the upper part of this semiconductor chip and this base might be covered When the above-mentioned semiconductor chip is pinched by the current carrying part prepared in the upper part of the two above-mentioned bases, it is characterized by connecting the two polar zone electrically to this base, respectively.
[0006]
[Function] According to the above-mentioned composition, since the polar zone of this semiconductor chip may be electrically connected to this base when semiconductor chips, such as a Light Emitting Diode chip, are directly pinched by the current carrying part of two bases, it becomes easy like an erector. Moreover, since the polar zone of a semiconductor chip may be certainly connected to the current carrying part of the above-mentioned base, assembly cost may be reduced. Moreover, in a routing, since it seems that the electrical installation to the base of a semiconductor chip is not spoiled, the yield will improve and a semiconductor device is manufactured by the low cost as a whole.
[0007]
[Example] Hereafter, based on the example shown in the drawing, this invention is explained in detail. Drawing 1 shows one example of Light Emitting Diode manufactured with the application of this invention. Light Emitting Diode10 Two bases 11 and 12 which consist of the resin prolonged in parallel substantial up and down, for example, a white resin with a high reflection factor The Light Emitting Diode chip 13 attached in notch 11b prepared in the side which counters mutually [the upper-limit sides 11a and 12a formed in the concave of bases 11 and 12], and 12b, It consists of lenses 14 fabricated by the resin mould of a transparent resin so that this Light Emitting Diode chip 13 and the upper-limit field of bases 11 and 12 might be covered.

[0008] The electric conduction patterns 11c and 12c with which the above-mentioned bases 11 and 12 are prolonged from the side of the notches 11b and 12b to the lower part are formed along the front face.
[0009] When producing above-mentioned Light Emitting Diode10, as are shown in drawing 2 (A), and the electroconductive glues 15, such as a silver paste, are first applied to the side of the notches 11b and 12b of bases 11 and 12 and it is shown in drawing 2 (B) After pasting up the Light Emitting Diode chip 13 to notch 11b of one base 11 and making one polar zone contact, as shown in drawing 2 (C), both [these] the bases 11 and 12 are made to counter, and it joins. By this, bases 11 and 12 will pinch the Light Emitting Diode chip 13 in notch 11b and 12b, while being combined mechanically mutually. By this, the Light Emitting Diode chip 13 will be electrically connected to the current carrying part equipped with the two polar zone in notch 11b of bases 11 and 12, and 12b, respectively, and it may connect with the lower part of these bases 11 and 12 electrically through the electric conduction patterns 11c and 12c further formed along the front face of these bases 11 and 12.
[0010] Then, as shown in above-mentioned drawing 1 , when a lens 14 (chain-line illustration) is formed of the resin mould of a transparent resin, Light Emitting Diode10 will be completed so that the Light Emitting Diode chip 13 and the up field of bases 11 and 12 may be covered.
[0011] Thus, if electric supply is performed for the Light Emitting Diode chip 13 through the electric conduction patterns 11c and 12c from the lead section (not shown) of the lower part of two bases 11 and 12, constituted Light Emitting Diode10 While the part carries out outgoing radiation of the light which this Light Emitting Diode chip 13 emitted light, and carried out outgoing radiation from the Light Emitting Diode chip 13 at this time upwards directly Incidence is carried out to the upper-limit sides 11a and 12a where other parts were fabricated by the concave of bases 11 and 12, and luminous efficiency is raised like Light Emitting Diode equipped with the conventional reflector from being reflected toward the upper part.
[0012] Drawing 3 shows other examples (this example is also set to Light Emitting Diode) of the semiconductor device by this invention, and if it removes the point that bases 11 and 12 are formed in one through the hinge 16, it is the same composition as the example of drawing 1 . In this case, when pin 11d is prepared in the medial surface of one base 11, this base 11 is closed to the base 12 of another side, the medial surface counters the medial surface of the base 12 of another side and it is made to contact, the engagement to which this pin 11d was prepared in the medial surface of a base 12 -- by inserting in 12d of holes, it is made to join together to the base 12 of another side, and fixed maintenance of one base 11 is carried out
[0013] In addition, although bases 11 and 12 are the products made of a resin and the electric conduction patterns 11c and 12c were formed to [out of a notch] the downward lead section along the front face, you may make it form not only this but a base 11 and 12 the very thing as a metal leadframe in the example mentioned above. In this case, an insulating material is made to be placed between the medial surfaces which bases 11 and 12 counter mutually, and it is necessary to make it not contact them electrically mutually. Moreover, you may make it the Light Emitting Diode chip 13 form a golden bump etc. in the front face of not only this but the electric conduction patterns 11c and 12c in the above-mentioned explanation, although the electroconductive glue 15 connects electrically to the electric conduction patterns 11c and 12c within notch 11b and 12b instead of applying an electroconductive glue 15. moreover, as shown in drawing 4 , in order to ease the stress to the Light Emitting Diode chip 13 and to ensure junction, it is good also as structure which uses for the end of a leadframe 17 what gave spring nature, and pinches the Light Emitting Diode chip 13
[0014]
[Effect of the Invention] Since the polar zone of a semiconductor chip may be certainly connected to the current carrying part of a base while becoming easy like an erector, since the polar zone of this semiconductor chip is electrically connected to this base like according to this invention when [which were described above] semiconductor chips, such as a Light Emitting Diode chip, are directly pinched by the current carrying part of two bases, assembly cost may be reduced. Moreover, in a routing, since it seems that the electrical installation to the base of a semiconductor chip is not spoiled, the yield will improve and a semiconductor device may be manufactured by the low cost as a whole. In this way, while assembly of a semiconductor chip may be performed simply and certainly according to this invention, the extremely excellent semiconductor device by which the electrical installation to the base of a semiconductor chip is not spoiled in a routing is offered.

[Translation done.]

* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1] The semiconductor device characterized by the ability of the two polar zone to connect electrically to this base, respectively when pinched by the current carrying part which is characterized by providing the following, and by which the above-mentioned semiconductor chip was prepared in the upper part of the two above-mentioned bases in the semiconductor device. Two bases which may be electrically connected to the exterior. The semiconductor chip to which the polar zone of another side is electrically connected for one polar zone to the upper part of another side of the above-mentioned base as opposed to one upper part of the above-mentioned base, respectively. The lens section fabricated by the resin mould so that the upper part of this semiconductor chip and this base might be covered.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the outline cross section showing one example of Light Emitting Diode which applied this invention.
[Drawing 2] It is the schematic diagram in which it is shown like the erector of Light Emitting Diode of drawing 1 one by one.
[Drawing 3] It is a perspective diagram before the assembly of the base in other examples (Light Emitting Diode) of the semiconductor device by this invention.
[Drawing 4] The important section of the example of further others of the semiconductor device by this invention (Light Emitting Diode) is shown, and (A) is [the cross section after the assembly of a base and (C of the perspective diagram before the assembly of a base and (B))] the perspective diagrams of the point of a leadframe.
[Drawing 5] It is the outline cross section showing an example of the conventional semiconductor device (Light Emitting Diode).

[Description of Notations]
10 Semiconductor Device (Light Emitting Diode)
11 Base
11a Upper-limit side
11b Notch
11c Electric conduction pattern
12 Base
12a Upper-limit side
12b Notch
12c Electric conduction pattern
13 Light Emitting Diode Chip
14 Lens Section
15 Electroconductive Glue
16 Hinge
17 Leadframe

[Translation done.]

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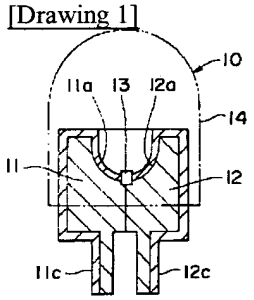
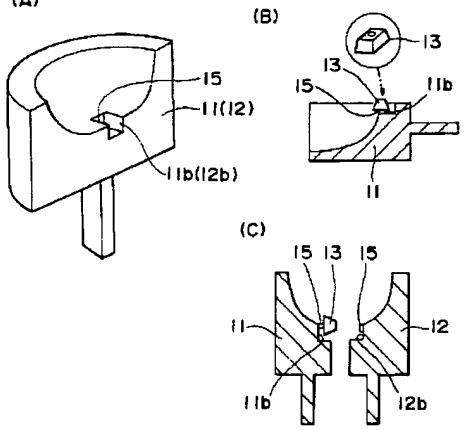
DRAWINGS

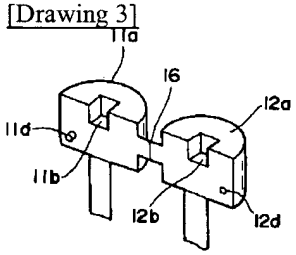
[Drawing 1]



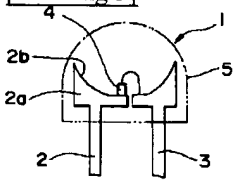
[Drawing 2]



[Drawing 3]

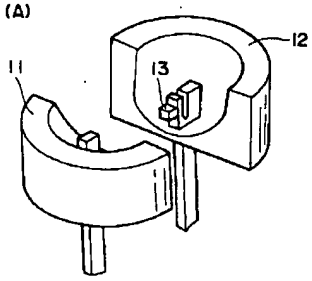


[Drawing 5]

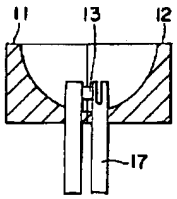


[Drawing 4]

(A)



(B)



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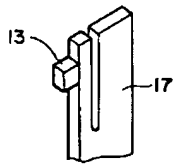

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